

Claims

1 1. A process for fabricating a microelectrode, comprising: a) providing a
2 substrate comprising at least one polymer micro-ridge, wherein the polymer micro-ridge
3 comprises an upper surface and two walls, the two walls forming an angle with a lower
4 surface; b) depositing a metal thin film on the upper surface, the two walls, and the lower
5 surface; and c) etching a predetermined amount of the deposited metal thin film on the
6 lower surface to form the microelectrode.

1 2. The process of Claim 1, wherein etching a predetermined amount of the
2 deposited metal thin film on the lower surface comprises wet etching, dry etching, ion
3 beam bombardment, or any combination thereof.

1 3. The process of Claim 1, wherein providing the substrate comprising at
2 least one polymer micro-ridge comprises molding, imprinting, photolithographic
3 patterning, imprint lithography, or any combination thereof.

1 4. The process of Claim 1, wherein providing the substrate comprising at
2 least one polymer micro-ridge comprises dry etching a polymer thin film.

1 5. The process of Claim 1, wherein the polymer micro-ridge comprises a
2 linear polymer, a crosslinked polymer, an organically modified sol-gel, or any
3 combination thereof.

1 6. The process of Claim 1, wherein the lower surface comprises silicon
2 dioxide.

1 7. The process of Claim 1, wherein the lower surface comprises a polymer.

1 8. The process of Claim 7, wherein the lower surface comprises a linear
2 polymer, a crosslinked polymer, an organically modified sol-gel, or any combination
3 thereof.

1 9. The process of Claim 1, wherein the polymer micro-ridge and the lower
2 surface comprises the same polymer.

1 10. The process of Claim 1, wherein the angle between the two walls and the
2 lower surface is about 90 degrees.

1 11. The process of Claim 1, wherein the upper surface and lower surface are
2 substantially parallel.

1 12. The process of Claim 11, wherein the walls are substantially perpendicular
2 to the upper surface and the lower surface.

1 13. The process of Claim 1, wherein the substrate comprises a plurality of
2 polymer micro-ridges.

1 14. The process of Claim 13, wherein the micro-ridges are interdigitated.

1 15. The process of Claim 1, wherein the metal thin film is selected from the
2 group consisting of gold, platinum, titanium, and any combination thereof.

1 16. The process of Claim 1, wherein depositing the metal thin film according
2 to a process comprises physical vapor deposition, thermal evaporation, electroplating, or
3 any combination thereof.

1 17. A process for fabricating a microelectrode comprising: a) providing a
2 substrate comprising at least one polymer micro-ridge, wherein the polymer micro-ridge
3 comprises an upper surface and at least one wall, the wall forming an angle with a lower
4 surface; b) depositing a metal thin film on the upper surface, the wall, and the lower
5 surface; c) etching a predetermined amount of the deposited metal thin film on the lower
6 surface or the deposited metal thin film on the upper surface; and d) etching a
7 predetermined amount of the other of the deposited metal thin film on upper surface or
8 the deposited metal thin film on the lower surface, thereby leaving a metal thin film on
9 the wall.

1 18. The process of Claim 17, wherein etching a predetermined amount of the
2 deposited metal thin film on the lower surface, upper surface, or both according to a
3 process comprises wet etching, dry etching, ion beam bombardment, or any combination
4 thereof.

1 19. The process of Claim 17, comprising first etching a predetermined amount
2 of the deposited metal thin film on the upper surface, and then etching a predetermined
3 amount of the deposited metal thin film on the lower surface.

1 20. The process of Claim 17, comprising first etching a predetermined amount
2 of the deposited metal thin film on the lower surface, and then etching a predetermined
3 amount of the deposited metal thin film on the upper surface.

1 21. The process of Claim 17, wherein providing the substrate comprising at
2 least one polymer micro-ridge comprises molding, imprinting, photolithographic
3 patterning, imprint lithography, or any combination thereof.

1 22. The method of Claim 17, wherein providing the substrate comprising at
2 least one polymer micro-ridge comprises dry etching a polymer thin film.

1 23. The process of Claim 17, wherein the polymer micro-ridge comprises a
2 linear polymer, a crosslinked polymer, an organically modified sol-gel, or any
3 combination thereof.

1 24. The process of Claim 17, wherein the lower surface comprises silicon
2 dioxide.

1 25. The process of Claim 17, wherein the lower surface comprises a polymer.

1 26. The process of Claim 25, wherein the lower surface comprises a linear
2 polymer, a crosslinked polymer, an organically modified sol-gel, or any combination
3 thereof.

1 27. The process of Claim 17, wherein the polymer micro-ridge and the lower
2 surface comprise the same polymer.

1 28. The process of Claim 17, wherein the angle between the two walls and the
2 lower surface is about 90 degrees.

1 29. The process of Claim 17, wherein the upper surface and lower surface are
2 substantially parallel.

1 30. The process of Claim 29, wherein the walls are substantially perpendicular
2 to the upper surface and the lower surface.

1 31. The process of Claim 17, wherein the substrate comprises a plurality of
2 polymer micro-ridges.

1 32. The process of Claim 31, wherein the polymer micro-ridges are
2 interdigitated.

1 33. The process of Claim 17, wherein the metal thin film is selected from the
2 group consisting of gold, platinum, titanium, and any combination thereof.

1 34. The process of Claim 17, wherein depositing the metal thin film according
2 to a process comprises physical vapor deposition, thermal evaporation, electroplating, or
3 any combination thereof.